The Chemical Age

A Weekly Journal Devoted to Industrial and Engineering Chemistry

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The Chemist Looks at the Potato

THE basic importance of the potato in the war economy of Europe no doubt induced the Food Group of the S.C.I. to hold a " symposium " upon it, in the course of which three exceedingly interesting papers were presented. Dr. R. N. Salaman, F.R.S., dealt with the biology of the potato, Dr. Lampitt and Mr. N. Goldenberg discussed its composition, and Dr. Harriette Chick learnedly examined its nutritive value. No doubt it is exceedingly important and timely that this information should be brought to the notice of food chemists in general, in so far as they are not already conversant with the subject, but, as will be evident from the papers, it would seem even more important that the information in a popularised form should be disseminated to a wider audience comprising all those who grow or cook the potato. It may well be asked whether, from a war angle, we are not undertaking educational work too late and have not indeed already " missed the bus."

The value of the potato can be deduced by those without prior knowledge of the subject only through a study of all three papers presented, and this we shall endeavour to do in a few words. If it be granted, as is indeed the fact, that the potato is a valuable food, there will be agreement with Dr. Salaman's contention that an outstanding value lies in its unlimited adaptability to its environment. There are many varieties of the potato; in fact it would seem that a variety can be discovered or bred to suit every viable climate and soil, and equally to suit the demands of the consumer. To this must be added the important characteristic that, being propagated by tuber, it reproduces itself without variation. Once a particular type of plant is selected because of some advantageous quality, that quality is secured at once and for all by merely planting its tubers from season to season. Thus, by reason of its wide and inherent genetic plasticity, its sexual fertility, and its capacity of immediate fixation of characters by vegetative reproduction, the potato has come to occupy a unique position in the science of horticulture. A further advantage is that it is readily stored over the winter and spring without those special precautions needed for so many foods. Possibly this is a less fundamental advantage to-day, when chemical engineering has been applied to food preservation, than it was a few decades ago; nevertheless, it is still important because of the cost of providing necessary storage plants and of the time that would be taken in war time to build them.

The potato is an important energy-bearing food and is thus of special importance as a partial substitute for bread and for those cereals which to a large extent need to be imported. It can of itself provide sufficient assimilable nitrogenous matter to keep human beings healthy. Dr. Chick has given a learned survey of experiments which show that a diet consisting only of potato and margarine is sufficient to maintain a normally active human being in robust health; in this respect practice has gone in advance of science, for the Irish peasantry of a hundred years ago relied so greatly for their diet, perforce, upon the potato, that when the potato crop was blighted in 1845 the resulting famine and its consequences reduced the Irish population from eight to four millions. Even to-day very little is known of the nature of the non-protein nitrogenous substance in the potato.

The potato is a valuable source of vitamin C. Unfortunately the usual methods of cooking potatoes by boiling results in a considerable destruction of this vitamin and Dr. Chick points out that potatoes should always be steamed. The potato is also a valuable source of vitamin B and its content of this appears to be greater than that of white bread and about equal to that of wholemeal bread, though here again a good deal of the vitamin is lost by solution in the water when the potatoes are boiled. Frequently, when reading the valuable contributions from the Food Group, we come across instances in which the usual method of cooking foods destroys or removes more of their valuable constituents than is necessary. This fact is a powerful argument for the suggestion that more attention should be paid to the training of the " better half " of the population that is responsible for cooking, so that the proper application of cooking to health as distinct from the general application of cooking to palatability should be understood. Greater attention to food chemistry should be paid during school days.

Dr. Chick's remarks on the vitamin content of the potato reminded us of a comment made by Dr. Lampitt in his Cantor Lectures to the Royal Society of Arts last spring in which he pointed out that the science of food is an ever-widening circle and, he added, " the theory of ' calorie ' feeding has given place to the ' vitamin ' hypothesis, the limitations of which are now being more and more realised; to-morrow or next year a new concept on food and diets will be developed." In the light of this fact one feels inclined to judge the potato more in the light of human experience than by its content of any particular chemical compound which represents the scientific hypothesis of the moment. It is thus interesting to learn from Dr. Chick that the value of potatoes as a preventive of scurvy in winter,

when other vegetables and fruit are not available, has been shown by the serious outbreaks of scurvy which in the past have followed failure of the potato crop in Ireland, as for example in the great epidemic of 1847. All epidemics of scurvy in Norway in the 19th and early 20th century have had a similar history. There are also certain facts which indicate the advantages of substituting potatoes for cereals in securing better utilisation of calcium and phosphorus for nutrition of the teeth. The natives of Tristan da Cunha consume a diet in which potatoes are the principal source of carbohydrate and milk is also abundant, but no grain is grown on the island the remote situation of which prevents a regular import. Marshall (in 1926) after examining the teeth of over one-third of the small population found a remarkable freedom from dental caries even in persons of middle and old age.

The value of the potato is not exhausted by its importance as a food. Our readers will remember that we recently published articles describing the uses of the potato as a raw material for the chemical industry and principally in the manufacture of alcohol from the starch which it contains (THE CHEMICAL AGE, 1940, *42*, Nos. 1089-1092). Broadly speaking, the constituents of the potato consist of water, starch, sugars, pectins and celluloses, proteins and other nitrogenous substances, minerals and " trace " elements, vitamins and enzymes. One wonders on reading this list how far the food chemist of the future may employ methods of extraction by solvents or other chemical processes to increase the uses of the potato in chemical industry.

So far as can be learned from this symposium the potato has only one defect, namely, that it is subject to many diseases. Only three of these, however, are sufficiently severe to affect the economic situation. The " wart disease " is caused by a fungus which survives persistently once the soil has become infected, but which can be overcome by growing in the infected soil varieties of potato that which are immune to the disease. " Blight " is also due to infection by fungus and was responsible for the Irish famine of 1845. It can be controlled by spraying the growing plants with copper fungicides. Dr. Salaman remarks that blight-resistant varieties can be bred but that " in England this work has received very little encouragement from any quarter; the wholesale trade in particular has looked askance at the prospect of an immune potato whose advent would almost certainly lower prices—a crime not readily condoned in the potato world." " Virus diseases " also affect the potato and seem to be due to infection by very small particles which perhaps may not even be microbiological in their character. The annual loss in Great Britain due to virus disease is conservatively estimated at 30 per cent. of the potential crop, i.e., at present prices a value of some £15,000,000. The only control so far known is the provision of virus-free potato seed. Dr. Salaman maintains that, on the assumption that the potato is one of our most important bulwarks against want in time of war, the conversion of the potatoes of this country from " a mixed healthy, quasi-healthy, and virus-infected crowd " into a high-yielding healthy population ranks among the most urgent of our war tasks. The key to the solution is the propagation of virus-free tuber seed. But to complete such a task would take five or six years' intensive administration and technical work. Perhaps it can be done in time for the next war!

NOTES AND COMMENTS

Insurance of Buildings

THE Government Bill for the compulsory insurance of all buildings against war damage is a gigantic affair and demands a great deal of close study from the business interests which will have to find the greater part of the premiums. The estimate is that these will yield the annual sum of £200,000,000, and the basis is 2s. in the £ on the property-tax value of buildings. As the contributions are not due to be paid until July 1, 1941, cover is to be given for any war damage caused during the first year and ten months of the war. Exactly where this cover is to come from is one of the important points to be elicited hereafter. What is certain is that every business in the land has to shoulder a heavy new burden, and that the accounts of all will have to be seriously readjusted. The problem of payment for damage may prove more formidable even than that of the rate of contribution, as the time factor must be of primary concern to the owners of damaged or destroyed buildings. It can be foreseen that a thousand and one knotty points will be raised for discussion when the Committee stage of the Bill is reached in the House of Commons. Meanwhile there will be a general disposition to suspend judgment until the full scope of an unprecedented piece of legislation has been unfolded by the Government.

Chemical Sparkle from the Pulpit

A LONDON clergyman, Prebendary T. Wellard, gave a new version of " Twinkle, Twinkle, Little Star " in a recent sermon. " Do children now say, ' How I wonder what you are?' " he asked. " No, they say:

> ' Twinkle, twinkle, little star,
> Now we all know what you are;
> Flames of soda, streaks of tin,
> Sulphuretted hydrogen!' "

Cheers from the U.S.A.

"CONGRATULATIONS on the grand fight you people are putting up against our common enemy. The second contingent of U.S. destroyers off to England to-day, I hear. Hurrah!" This message reached us during the week from a correspondent in an inland Western State—from Denver, Colorado, to be exact—and we should like to share with our readers the warmth of feeling that it expresses. Even in these days, when physicists have taught us humble chemists that space is merely an abstraction, a message of friendship coming from many thousand miles away carries with it a special note of encouragement. If, as Sir Philip Joubert put it in a recent wireless commentary, the gloomy days of the English winter tend to make us look momentarily on the dark side of things, a few words of cheer like the above act as a wonderful tonic—to a hard-pressed Editor even the paper shortage seems less tiresome!

REMOVAL AND RECOVERY OF SULPHUR FROM SMELTER GASES, III

Catalytic Processes

by D. D. HOWAT, B.Sc., A.Inst.M.M., A.I.C., Ph.D.

(*Continued from page 261, "The Chemical Age," December 7, 1940*)

LEPSOE'S work deals also with the catalytic reduction of sulphur dioxide by carbon monoxide, as shown in equation (3) and by carbonyl sulphide :—

$$SO_2 + 2COS = 2CO_2 + 3/2S_2 \quad \ldots \quad \ldots \quad (5)$$

He points out that sulphur dioxide may be reduced directly by carbon monoxide if that gas is available as water-gas or is the cheapest fuel available. Generally, however, reduction by carbon monoxide and carbonyl sulphide is brought into use as a step subsequent to the reduction by carbon in the producer. Special catalysts, the active constituents of which are ferric oxide or hydrated aluminous oxide, or both, are prepared in a highly porous sintered form and introduced into the catalyst chambers. The reduction of sulphur dioxide by carbon monoxide or carbonyl sulphide is very fast with an efficient catalyst of the type mentioned at temperatures as low as 250° to 500° C. To obtain the correct proportions, sulphur dioxide must be added to the exit gases from the producers in such amounts that the ratio SO_2 to (CO + COS) is maintained at the value 1 :2.

In order to maintain the efficiency of the catalysts the entering gases must be kept free of dust or the surface of the catalyst will become coated with a layer of dust, the presence of which seriously lowers its efficiency. An electrostatic precipitator offers the most efficient means of removing this dust from the gases entering the catalyst chamber, but before the gases may be treated in such a machine the reduced sulphur present must either be condensed or converted to the gaseous carbonyl sulphide. This latter alternative is made use of at the Canadian works.

The I.C.I. Process

For experimental purposes a 5-ton-per-day plant was built by I.C.I., Ltd., about four years ago. The following is a rough outline of the process employed. Pure sulphur dioxide from the concentration plant, diluted with air to give a gas containing 50 to 60 per cent. sulphur dioxide, is preheated to 300° C. and passed into the producer, the temperature in which is maintained at over 1200° C. Exit gases from the producer, at a temperature of 800° to 900° C., contain carbon dioxide, gaseous sulphur, carbon monoxide, carbonyl sulphide and some small quantities of hydrogen sulphide. They are passed to the first catalyst chamber where the unchanged sulphur dioxide reacts with the carbon monoxide, carbonyl sulphide and hydrogen sulphide to give sulphur. The gases pass to a second catalysis chamber through a preheater, in which the air-sulphur-dioxide mixture is heated before entering the producers. In passing from the second catalysis chamber to a waste-heat boiler a certain amount of the sulphur is condensed, steam being generated at a pressure of 20 lb. The remainder of the sulphur is deposited when the gases enter a steam-jacketed Cottrell mist precipitator. After scrubbing with steam and water the exit gases are mixed with the waste gases from the absorption plant and passed to the stack. The total gaseous sulphur compounds in the gases leaving the reduction plant may be reduced to 1½ to 2 per cent., the theoretical efficiency of the reduction plant being about 96 per cent.

In the Canadian process standard water-gas type producers are used for the reduction of the concentrated sulphur dioxide from the ammonia concentration plant. Apparently the sulphur dioxide is mixed with pure oxygen,[3] in amounts varying from 11 to 18 per cent., and the mixture passed through the coke-bed of the producers. In the hot zone the normal reactions (1), (2), (3) take place. As they move upward through the producer the temperature of the gases falls gradually to a value of about 1000° C., dropping still further to 700° C. at the top of the bed. A further reaction starts in the top zone between the temperature limits just mentioned, the carbon monoxide, formed in the reduction zone, combining with the sulphur vapour to form carbonyl sulphide according to reaction (4).

The process has been modified in such a way[5] that this reaction is employed to convert practically all the elementary sulphur formed in the producer into the gaseous carbonyl sulphide. The importance of this modification lies in the fact that since the sulphur is all in the gaseous form, substantially complete separation of any impurities may be effected by the use of Cottrell electrostatic precipitators. In this way a very high degree of purity in the final product is rendered possible.

An excess of carbon monoxide is required to convert all the reduced sulphur to carbonyl sulphide, the required excess being produced by admitting to the producer the necessary amount of the gas from some external source, such as an auxiliary gas producer. Alternative methods of producing the excess of carbon monoxide are suggested. Oxygen or air may be admitted to the upper part of the reduction zone where the temperature is falling to effect the endothermic reduction of carbon dioxide by carbon according to reaction (2). Such oxygen-bearing gas is admitted through one or more rows of inlet pipes or tuyères to avoid sticking or clinkering due to excessively high temperatures. The simplest method of all, however, is to use carbon-dioxide-containing gas, such as the exit gas from the process itself. The gas, preheated by external means if necessary, forces the equilibrium to the right in reaction (2) so providing the required carbon monoxide. After passing through the electrostatic precipitators an adequate amount of clean gas containing sulphur dioxide is mixed with the exit gases from the producers. This mixture of gases, the temperature of which is raised in preheaters, is then passed through catalyst chambers to bring about reaction (5).

The additional sulphur dioxide also reacts with any carbon monoxide present in the gas according to reaction (3), being reduced to sulphur.

Alumina Catalyst

Reactions (3) and (5) proceed easily in the temperature range 250° to 500° C. in the presence of a suitable catalyst. A highly porous sintered mixture of alumina in which some of the water of hydration is retained is employed as the catalyst in Canada.[4] A mixture containing one part of fireclay, one part of aluminium hydrate, two parts of sawdust and 1.75 parts of aqueous sodium silicate is moulded into bricks, slowly dried, and heated to 1000-1100° F. to cause sintering and fusion of the aluminium hydrate with the sodium silicate In the same operation the sawdust is burned out, the bricks being rendered highly porous, while the temperature is sufficiently low to allow part of the water of hydration of the alumina to be retained. Microscopic examination of the sintered agglomerate of fireclay and alumina shows the surface of the cavities covered with numerous prills or nodules of aluminium hydrate fused to the fireclay skeleton. In such a structure there is an enormous increase in the surface area of the active catalyst exposed to the action of the gases. The surface of the catalyst should not be contaminated with dust from the gases, hence the importance of utilising the electrostatic cleaning process before the catalysis stage.

From the brick-lined catalysis chamber the gases pass to waste-heat boilers, the gaseous sulphur being condensed in

the form of liquid or mist. Further treatment in a Cottrell mist precipitator removes any further sulphur from the gases before they are discharged from the system.

It has been found that ordinary clean smelter gas, provided it is substantially free of oxygen, may be used as the source of the additional sulphur dioxide required for the catalysis step. Consequently it becomes no longer necessary to treat all the smelter gas in the concentration plant; only a predetermined fraction need be passed through this stage, the remainder being used directly as the additional (secondary) sulphur dioxide supplied to the catalysis chambers. Considerable saving in the operation of the concentration process and a reduction of the plant capacity necessary have thus been effected. The daily plant production of the Canadian company is about 60 tons of elementary sulphur of more than 99.95 per cent. purity.

The process employed at Boliden is essentially one for direct reduction of the sulphur dioxide in the raw smelter gases, and is the only commercial process of this type in operation.[1, 12] In operation it is necessary that the sulphur dioxide content of the smelter gases should be as high as possible and the oxygen as low as possible. The primary reducing agent is coke, but the producers are used to treat only a fraction of the smelter gas, producing thereby the so-called "reducing gas," which is employed in turn to reduce the remaining and larger portion of the gases in a suitable catalyst tower.

The process may be divided into three stages: (1) the manufacture of the "reducing gas"; (2) catalytic reduction of the sulphur dioxide in the remainder of the smelter gases by means of the reducing gas; and (3) cooling of the gases with separation of the reduced sulphur by electrostatic precipitation.

A portion of the smelter gases, called the "direct gas," diluted with air to a given value and preheated to 300-350° C., is blown into the producer. The exit gases are a mixture of carbon dioxide and monoxide, gaseous sulphur, carbonyl sulphide, carbon disulphide and hydrogen sulphide, the last being derived from water carried by the smelter gases. The remaining fraction of the smelter gas, known as the "by-pass gas," is added to the reducing gas and the mixture passed into a catalyst chamber. Any oxygen in the by-pass gas combines with the carbon monoxide and a rapid rise in temperature occurs. The reduction of sulphur dioxide by carbon monoxide and carbonyl sulphide have already been discussed under reactions (3) and (5) respectively. Other reactions which occur as the mixture of reducing gas and by-pass gases is passing over the surface of the catalyst are:—

$$SO_2 + 2H_2 = 2H_2O(g) + \tfrac{1}{2}S_2(g) + 32 \text{ cals.} \quad (6)$$

$$SO_2 + 2H_2S = 2H_2O(g) + 3/2S_2(g) - 8 \text{ cals.} \quad (7)$$

$$SO_2 + CS_2 = CO_2 + 3/2S_2(g) \pm 0 \text{ cals.} \quad (8)$$

The reactions do not go quite to completion and the final waste gases, after condensation of the sulphur, still contain small quantities of gaseous sulphur compounds.

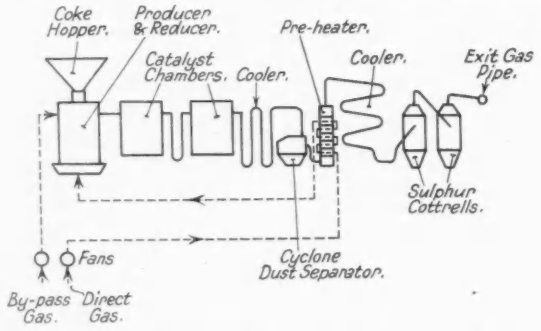

Fig. 9. Flow sheet of the Boliden SO_2 reduction plant (Applebey).

The accompanying diagram (Fig. 9) shows the general arrangement of the plant, most of the units of which are constructed of mild steel plate lined with firebrick. In the preheater the direct gas is heated to 300-350° C. and the reduced gas cooled by a corresponding amount. The producer is of standard type, constructed of mild steel shell lined with refractory and fitted near the top with an inlet for admission of the by-pass gas. The direct gas enters the producer through the rotating grate. Two features in the producer may be noted; the depth of the coke bed is much greater than in ordinary producer-gas operation; a specially constructed water-seal is required on account of the high internal gas-pressures, ash being discharged through this seal in the usual way. On addition of the by-pass gas a rise in temperature occurs before the gases enter the first catalyst chamber. The two catalyst chambers are connected by a pipe, in the form of a large vertical "U," to allow of some air-cooling of the gases. A wall with a gas passage near the bottom divides the catalyst chamber into two sections, and the catalyst, consisting of mixed ferric and aluminium oxides, is arranged to form a chequer-work inside each chamber. Arranged between the second catalyst chamber and the

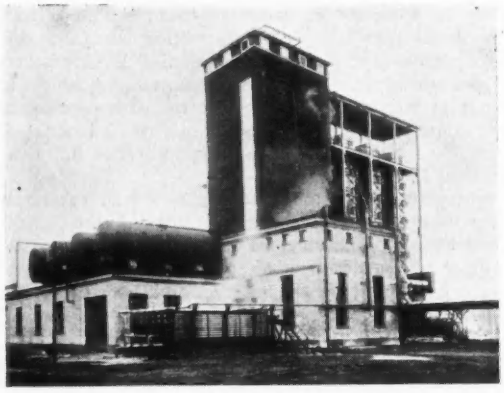

Fig. 10. Regeneration building, liquid SO_2 storage vessels, and regenerated liquor cooler at the plant at Imatra, Finland (Applebey).

preheater is a cooler composed of brick-lined pipes and a cyclone dust separator, for the removal of suspended material in the gases. From the preheater the gases pass to a large sheet-iron cooler in which separation of the liquid sulphur begins. The remainder of the sulphur is recovered in two Cottrell mist precipitators. The liquid sulphur from the coolers and the precipitators runs into steam-jacketed catch-pots from which it is discharged into small trucks. Suspended matter is removed in steam-heated sulphur tanks from which the purified product is pumped to large wooden moulds in which it solidifies. At Rönnskär each of these moulds contains several thousand tons of sulphur from which it is reclaimed by mechanical shovels loading directly into railway waggons or to steamers. The annual capacity of the plant is 25,000 tons of elementary sulphur.

With the exception of two British patents[6] covering the developments of the process, no other technical account of the Metallesgellschaft process for the reduction of sulphur dioxide to sulphur appears to be available. In the first of the two patents granted it was claimed that the sulphur dioxide was reduced in a shaft furnace of the producer type, employing a very shallow coke-bed, the depth of which was not greater than 35 cm. By this procedure the greater part of the carbon was oxidised to carbon dioxide and the endothermic reduction of carbon dioxide to carbon monoxide was controlled to a certain extent, so affording a considerable saving in coke. A high gas speed was maintained through the producer, the exit gases containing quantities of unreduced sulphur dioxide, together with some carbon monoxide and some gaseous sulphur compounds. The gaseous mixture was subjected to further treatment at about 600° C. in the presence of a bauxite catalyst, so that all the sulphur was reduced to the elementary form. Additions of sulphur

dioxide had to be made to the gas mixture fed to the catalyst chamber. The success of the process was dependent on maintaining, in the effluent gases from the producer, the correct proportions to unreduced sulphur dioxide of carbonyl sulphide, carbon dioxide, monoxide and disulphide. Difficulty was experienced in maintaining the depth of the coke-bed at the predetermined value owing to the rapid oxidation of the coke and the frequent additions of fresh fuel required. Continuous records of gas analysis were required in order to be able to supply the constantly varying quantities of sulphur dioxide to the catalysis chambers.

The Newer Metallgesellschaft Process

The later patent, abandoning the use of the shallow coke-bed, calls for a depth of bed of 90 to 120 cms. The temperature of the bed is said to be from 1000° to 1200° C. and that of the issuing gases from 650° to 750° C., temperatures which are considerably lower than have been found necessary at other plants. Operating under these conditions, the exit gases from the producer are free of unreduced sulphur dioxide. The claim is made, however, that in the exit gases the ratio $(COS + CO)/CO_2$ remains constant, the laboratory results quoted in the patent literature giving a value of 0.33 to 0.35 for the constant. By the addition of the appropriate amount of sulphur dioxide, the source of which may be ordinary roaster gas, the carbonyl sulphide and carbon monoxide will react, giving a complete reduction to elementary sulphur according to reactions (3) and (5). The catalyst used is bauxite, temperatures up to 700° C. being attained in the catalyst chamber.

The constant ratio $(COS + CO)/CO_2$, which is claimed to be independent of the depth of the bed or other operating variables, is said to offer easy control of the process. The amount of additional sulphur dioxide required for the catalysis stage is calculated only on the volume of the exit gases from the producers at any given moment, so that extensive gas analysis is rendered unnecessary.

The success of the processes in general use depends very much on close control of the operating conditions, complete knowledge of gas compositions and volumes at all stages being essential. A feature of the plant at Rönnskär is the use made of automatic instruments for the control of gas rates, compositions, etc. It is claimed [12] that the satisfactory operation of the plant depends entirely on the existence of these control instruments, some of which were elaborated specially for the purpose by the Boliden Company. At this plant it has been found possible to employ in the control-room men with no special chemical training, who, by the aid of the necessary automatic instruments, are able to make the required changes in gas rates and volumes, all the changes being automatically recorded for future inspection.

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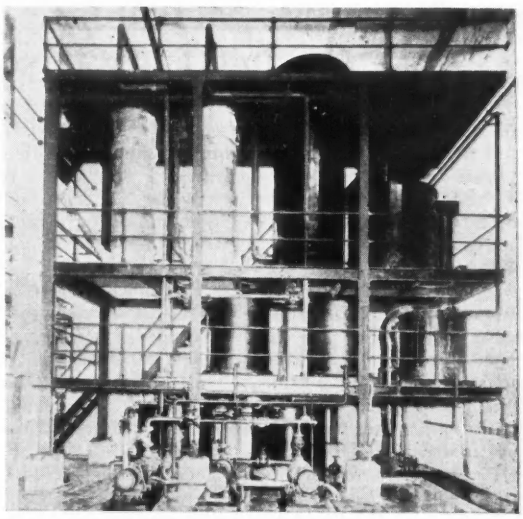

Fig. 11. Interior of the liquid SO_2 plant at Imatra, Finland. Plant for drying SO_2 gas before liquefaction (Applebey).

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Chemical Hose

New B.S.S. for Fabric-Reinforced Material

THE British Standards Institution has just issued a British Standard for Rubber Hose with Woven Fabric Reinforcement (No. 924; 2s.) which covers air hose, air hose (rock drill and/or mining hose), low-pressure water hose (for cold or hot water), high-pressure water hose for washing or spraying, chemical hose and brewers' hose.

This British Standard, the preparation of which was authorised by the Rubber Industry Committee of the Institution, deals with mandrel-built, wrap-cured rubber hoses internally reinforced by plies of woven fabric, manufactured in lengths not exceeding 60 ft. The hose may be reinforced externally by the use of round or flat wire.

Recommended Working Pressure

Certain basic differences exist between wrapped hose covered by these specifications and long-length moulded rubber hose as covered by B.S. No. 796-1938. In addition to differences in construction, the method of manufacture limits to 60 ft. the maximum length in which wrapped hose can be supplied. The bore of wrapped hoses can, however, be made smoother, more uniform and more accurate in respect of diameter and concentricity. These features are of special importance and value in certain industrial applications. The British Standard covers the more generally used types and sizes in normal demand. The pressure indicated in these specifications as the recommended working pressure (*i.e.*, one-fourth of the bursting pressure) should in every case be regarded as the maximum for each type of hose when used without wire reinforcement as indicated in paragraph two. The hoses dealt with in these specifications are not constructed for use under conditions involving internal pressures substantially below atmospheric.

A test for oil resistance to lining is under consideration and will be incorporated in the future revision.

Arsenic Determination

A Rapid and Convenient Distillation Method

IN a short paper presented to the Chemical, Metallurgical and Mining Society of South Africa, Dr. E. Frankel outlined a rapid method for determining arsenic by the distillation process. In view of its interest, we reprint the note, with grateful acknowledgments, from the Society's journal (1940, *41*, 3, 114-6). It will be noted that Dr. Frankel's method avoids the protracted tediousness of previously described methods.

In the course of numerous determinations of arsenic in antimonial ores and stibnite concentrates, it was felt that an accurate method for the determination of arsenic, less laborious and more rapid than the existing distillation methods, would be useful. The existing distillation methods, which make use of the volatility of arsenic as $AsCl_3$, vary in the reducing agents for the reduction of arsenic to the trivalent stage, and in minor details of the distillation apparatus itself. All these methods require a water-cooled condenser and entail the use of gas as the most practical means of heating. A further disadvantage is that very often the material to be analysed has to be transferred from a flask in which the decomposition has taken place to a special distillation flask, and so comparatively large quantities of liquid, sometimes 150-250 ml., have to be evaporated in order to determine rarely more than a few mg. of arsenic. In addition, when small quantities of arsenic have to be determined in the presence of large quantities of antimony, as for example in stibnite concentrates, it becomes necessary to submit the first $AsCl_3$ distillate to a second distillation, in order to separate $AsCl_3$ satisfactorily from accompanying traces of $SbCl_3$.

Double Distillation Avoided

The following method, which may be described as a semi micro method, is an endeavour to avoid some of the disadvantages just mentioned. It is particularly suitable for direct arsenic determination in the presence of large quantities of antimony without having to apply a double distillation. For this purpose, an air condenser, which takes the place of a water-cooled condenser, is used to convey the vapour from the distillation flask to the receiver. The ascending portion of the air condenser is longer than usual in order to create a fractionating effect on traces of $SbCl_3$ which tend to volatilise together with $AsCl_3$. HCl, $AsCl_3$, and steam are distilled directly into a solution of sodium bicarbonate containing considerable excess. In this manner excessive heat during neutralisation is avoided, and the contents of the receiver are ready for titration with N/100 iodine soon after the distillation is completed. The decomposition of the sample with nitric acid and sulphuric acid is carried out in the same flask in which the distillation takes place, whereby the volume of liquid to be evaporated is kept at a minimum.

The apparatus was assembled from ordinary equipment, a rubber stopper connecting the air condenser with the distillation flask. An apparatus with interchangeable glass joints would, however, be preferable.

The procedure adopted was as follows:—0.2 gm. of the finely ground sample is weighed into a 100 ml. Erlenmeyer flask of pyrex glass, 7 ml. of 10 N nitric acid and 5 ml. of 12 N sulphuric acid are added, and the flask with contents heated on an electric hot plate. If the sample is in liquid form a corresponding volume of liquid is taken. A few small pieces of unglazed porcelain are introduced into the flask to ensure regular and rapid boiling on the hot plate. After 25 to 30 minutes the decomposition is complete, and most of the nitric acid evaporated. Heating is continued for a further few minutes to allow sulphuric acid fumes to escape through the neck of the flask. The flask and contents are cooled and 5 ml. of water added. To the cooled liquid 1 gm. of hydrazine chloride, 1 gm. of potassium bromide, and 10 ml. of hydrochloric acid are added. The neck of the Erlenmeyer flask is washed free of acid with 8 ml. of water, and the apparatus is assembled within a few seconds. A second Erlenmeyer flask containing 12 gm. of sodium bicarbonate in approximately 50 ml. of water is used as a receiver.

At the beginning of the distillation traces of hydrochloric acid will be noticed escaping from the receiving flask. As minute quantities of $AsCl_3$ might escape, together with these traces of hydrochloric acid, it may be advisable, when considerable proportions of arsenic are present, to connect the receiving flask with a small secondary wash-bottle containing a few ml. of saturated sodium bicarbonate solution. The results obtained, however, and a series of quantitative determinations, not quoted but carried out with the object of determining such a possible loss of $AsCl_3$, indicate that only very small quantities of $AsCl_3$ can escape determination even when only one receiving flask is used. As soon as the liquid in the distillation flask is reduced to one half of its original volume (approximately 12 ml.), the distillation is interrupted by lifting the distillation flask from the hot plate and the glass tube out of the bicarbonate solution. Sodium bicarbonate adhering to the glass tube is washed back into the receiver by means of a jet from a wash-bottle.

The contents of the receiver, when cooled to room temperature, are titrated with N/100 iodine.

1 c.c. N/100 iodine = 0.0003748 gm. As.

After adding a further 5 ml. of hydrochloric acid to the distillation flask, this time using 8 gm. of sodium bicarbonate in the receiver, the distillation is continued for a few minutes until a mark on the distillation flask, indicating half of the original volume, is reached. The second distillation seldom recovers more than traces of arsenic. For correction purposes a blank determination with the chemicals in use should be carried out. The entire determination, including the decomposition of the sample with nitric and sulphuric acids, can be carried out in less than one hour.

New Synthetic Wax

Produced by Castor Oil Hydrogenation

A NEW synthetic wax, called Opalwax, which is finding industrial application as a substitute for montan and other similar waxes, has recently been introduced by the Ammonia Department of E. I. du Pont de Nemour & Co., Inc., Wilmington, Delaware. It is comprised principally of 12-hydroxy stearin (glyceryl trihydroxystearate) produced by the catalytic hydrogenation of castor oil and combining unusual physical and chemical properties. It is practically odourless, pearl-white in colour, has an apparent specific gravity of 0.98 to 0.99 at 20° C., is extremely hard, and has an acid number of less than 2.0. Opalwax is extremely insoluble in solvents. None of the common solvents has been found to dissolve as much as 2 per cent. of the wax at temperatures up to 30° C. Toluene, carbon tetrachloride and carbon bisulphide are the most effective. The synthetic wax is dissolved with severe discoloration by concentrated sulphuric acid. It is disintegrated and in part dissolved by concentrated nitric acid.

The Denver Vertical Centrifugal Sand Pump, which, it is claimed, will handle any material which can be made to flow by gravity to the feed opening, such as sticky flotation froth, gravity concentrates, etc., is described and illustrated in Bulletin No. P 10-D, issued by the DENVER EQUIPMENT CO., LTD., 493a Northolt Road, South Harrow, Middlesex.

Salvaging Waste Materials

How the Chemical Industry can Help

"THE Salvage of Waste Materials in the Chemical Industry" was the subject of an interesting discussion opened by Dr. A. B. Manning, Assistant Controller of Salvage, Ministry of Supply, at a joint meeting of the Chemical Engineering Group of the Society of Chemical Industry and the Institution of Chemical Engineers in the rooms of the Chemical Society, Burlington House, London, on Tuesday. Mr. H. W. Cremer, chairman of the Chemical Engineering Group, presided over a large attendance.

The subject of the discussion, said Dr. Manning, covered a wide range, as most branches of the chemical industry had their own particular salvage problems. Generally speaking, salvage was of increased importance to industry in present conditions and the salvage branch of the Ministry of Supply was willing to help solve the many problems that arose. In attempting to do this it had a wide range of knowledge at its disposal, being able to call on the co-operation of other appropriate branches of the Ministry of Supply, various controls of war materials, various branches of scientific and industrial research, and the chemical industry itself. In general the problems that arose presented one of two aspects: (1) finding a use for a waste material that arose as a result of some process or other; and (2) finding a method of recovering a material that was of value when recovered, but which presented difficulties in its recovery.

Recovery of Wool Grease

Dr. Manning went on to outline some of the problems with which the salvage branch is dealing. The first he mentioned was that of wool grease. He said that in the Bradford area, where the scouring of wool takes place, grease was scoured to the value of £14,000 a year. One third of that was recovered from the woolcombers themselves and worked up into lanoline, lubricating greases, paints, etc. The remaining two-thirds, emanating from the smaller woolcombing firms, was "dumped" into the sewers, being recovered at the sewage works. This formed a black, malodorous material of lower grade than the other; although subjected to a refining process after recovery, its appearance was only slightly modified and it was not very valuable. Before the war, markets for it were readily found on the Continent, where, possibly after further refining, it was utilised in the jute and leather industries and in the production of lubricants, oils, paints, etc. With the collapse of France, it became a problem to find a new outlet for this material. Two possible channels capable of absorbing the material in quantities suggested themselves: firstly paint, especially camouflage paint, in connection with which methods had been studied at the Teddington Research Station; and secondly a substitute for petroleum jelly, especially as an anti-corroding composition for metals, for which a method was now available.

Useful quantities of copper were recoverable from the effluents at copper works, said Dr. Manning, and the loss of chromium, especially in the chrome tanning of leather, could probably be reduced considerably. The Ministry of Supply would also welcome a method of disposing of waste cellophane.

Those also contributing to the discussion were Mr. F. Heron Rogers, President of the Institution of Chemical Engineers, who, in addition, proposed a vote of thanks to Dr. Manning; Mr. H. G. Judd, Controller of Salvage; Dr. Dorothy Jordan Lloyd, Director of Leather Research; Mr. J. Arthur Reavell; Mr. W. Lloyd Willey; Dr. H. S. Calvert; Dr. A. Parker; Dr. S. Baker; Mr. D. McDonald; Mr. L. J. Lemmon; Dr. A. R. Nanji; Mr. Edgar C. Evans; and the chairman.

A BRITISH-OWNED SYNDICATE is interested in developing possible sulphur producing properties in Mexico near the borders of the western states of Jalisco and Colima. The company, incorporated in California, will be known as the Colima and Ransburg Syndicate and is proposing to establish a refining plant at San Pedro, California.

Rot-Proofing of Sandbags

Cheap Method Announced by I.C.I.

IMPERIAL Chemical Industries have developed a cheap and easy method of rot-proofing sandbags. Bags filled with sand or soil and exposed to the weather are particularly liable to rot, and may in a few weeks become as much a danger as a measure of protection. The announcement of a remedy is therefore of the first importance, especially since the treatment is extremely cheap and simple. It consists of dipping the bags in two common chemicals, sodium carbonate and copper sulphate, so that the fibres become saturated in a basic copper carbonate suspension. Treatment with this mixture at the present price works out at no more than one-tenth of a penny per bag of normal size. It will, it is estimated, increase the life of sandbags in service at least eight times.

The bags must be treated *before they are filled*. No rot-proofing process is satisfactory when applied to bags already in place. Whether they are treated before or after being sewn up, particular care must be taken to treat the thread used for the seams, as it is often here that the rotting begins.

During the research into the rot-proofing of sandbags that I.C.I. have carried out over the past two years, samples of treated and untreated jute and cotton fabrics have been buried in garden soil for eight months. The fabric treated with the mixture remained in excellent condition while the untreated fabric was almost completely disintegrated. Equally good results were obtained with solutions of copper sulphate and soda used separately. It is obviously simpler to use the one-bath process, but in treating compact and tightly woven materials, or sandbags in compressed bales, it may be preferable to use successive immersions of copper sulphate and soda ash or washing soda. It is the copper which gives the resistance to rotting, and both these simple processes have been proved to give just as good results as the use of more expensive copper products.

The Treatment

In the treatment recommended 4½ lb. soda ash or 11½ lb. soda crystals should be used with 5 gallons of water and this should be stirred slowly into a solution of 10 lb. copper sulphate crystals in 30 gallons of water. Use a 50-gallon wooden vessel—not one of iron or galvanised iron. Make up the quantity to 40 gallons and add 2 oz. of Calsolene Oil HS, or other suitable wetting agent. Stir well. Immerse the sandbags until they are thoroughly saturated. Remove the excess liquor by wringing or in a hydroextractor. After wringing the bags should weigh twice their original weight. The bags should then be dried at a low temperature. Bags should be immersed for at least 5 minutes if cold water is used, but the process can be speeded up by warming the water to 30-40° C. (85-100° F.). Further particulars, including directions for the "two-bath process," can be obtained from Imperial Chemical Industries, Limited.

From the production of comparatively small pieces of laboratory ware in Vitreosil (a contraction of "vitreous silica"), the process has been developed and extended until large chemical and other similar plants have become regular items of manufacture. Recent developments include Vitreosil immersion heaters for the electrical heating of acid liquors used in chemical works, also air lift and ejector pumps for handling acid gases and liquors. These and many other similar items are described and illustrated in a list just issued by the THERMAL SYNDICATE, LTD., Vitreosil Works, Wallsend, Northumberland.

NEWS FROM SWITZERLAND indicates that an anthracite deposit has been located in the Lötschen-Tal, Canton Valais, and that mining operations have already started. In view of the severe coal restrictions in Switzerland this discovery is of great local importance.

Personal Notes

MR. H. O. SMITH, a director of Imperial Chemical Industries, Ltd., has been appointed Controller of Small Arms Ammunition at the Ministry of Supply.

MR. D. B. HOSEASON, M.I.E.E., M.I.Mech.E., M.A.I.E.E., has been appointed to the board of the Brush Electrical Engineering Co., Ltd., Loughborough.

DR. IAN W. WARK has been appointed officer in charge of the division of industrial chemistry in the new laboratory of the Australian Council for Scientific and Industrial Research at Fishermen's Bend, Melbourne.

MR. PETER F. BENNETT, who was President of the Federation of British Industries before Lt.-Col. Lord Dudley Gordon, has been adopted as National Government candidate for the Edgbaston Division of Birmingham, to fill the vacancy caused by the death of Mr. Neville Chamberlain.

DR. FREDERICK MEASHAM LEA, as announced in our last issue, has been awarded by the Administrators of the Beilby Memorial Fund the sum of one hundred guineas in recognition of his researches into the constitution of silicate systems and the chemistry of cement in its physico-chemical aspects. Dr. Lea was educated at King Edward VI School, Birmingham, and after war service in 1918-19, entered the University of Birmingham, where he gained the Frankland Prize for practical chemistry, and graduated B.Sc. with first-class honours in 1921, proceeding to M.Sc. in 1922 and D.Sc. in 1935. He was elected A.I.C. in 1922 and F.I.C. in 1936. In 1922-25 Dr. Lea was attached to the Admiralty Engineering Laboratory. Since then, except during 1928-29 when he was Guest Research Associate at the U.S. Bureau of Standards, Washington, D.C., he has been a member of the staff of the Building Research Station of the D.S.I.R., where he holds the position of Principal Scientific Officer.

Dr. Lea was a member of the Official British Delegation to the World Power Conference and Second International Congress on Large Dams held at Washington, D.C., in 1936, and has also been a British representative on the International Committee on Special Cements, and Honorary Secretary of the corresponding British Committee. He is at present Chairman of the Roads and Building Materials Group of the Society of Chemical Industry.

OBITUARY

MR. JAMES WILSON, late of McCulloch Bros. and Wilson, laboratory furnishers, Glasgow, died recently at Crosshill, Glasgow.

MISS ELIZABETH ALICE GORTON, a director of Edward Gorton, Ltd., chemical manufacturers, Warrington, has died at the age of 44.

MR. GRANT MCALLISTER FOWLER, M.Sc., F.C.I.C., who died recently at Vancouver, B.C., aged 43, was well known as a chemical engineer in the paper and pulp industry. He served in the last war with the McGill Battery, Royal Canadian Artillery, and since 1920 had held many important positions in the paper-making industry, including a term of three years (1924-27) in the Forest Products Laboratory, Montreal. At the time of his death he was plant superintendent of the Powell River Paper Company.

DR. JOHN WILLIAM BLAGDEN, who died on November 28, at Loughton, Essex, aged 67, was especially noted as a research chemist. Educated at Dulwich and Cambridge, where he took the M.A. degree, he proceeded to the Ph.D. degree at Würzburg. He spent many years researching in Germany, on the staff of Boehringer und Sohne, Mannheim, and was interned at Ruhleben in 1914-18. Returning to England, he was appointed head of the research laboratory of Howards and Sons, Ltd., Ilford, and shortly afterwards became a director of that company.

New Control Orders

Borax, Barium Nitrate, and Rubber Exports

FROM December 12, as the result of an Export Control Order of the Board of Trade, export licences are necessary for the export of the principal varieties of rubber (rubber, balata, and guttapercha, compounded unvulcanised rubber, waste and reclaimed rubber, rubber latex, etc.) to all destinations. Previously such goods could be exported to destinations in the British Empire without licence.

Export licences are also necessary from December 12 for the export to any destination of a variety of products, including barium nitrate, borax and boric acid, tanning substances such as cutch, gambier, and valonia, and all tanning extracts; and certain types of electrical measuring instruments.

Iron and Steel Prices

To meet increased rail charges maximum prices of scrap iron and steel have been raised from December 9. The Minister of Supply has issued the Control of Iron and Steel (No. 14) (Scrap) Order, 1940, and Direction (No. 1) under the order, which supersede previous orders and directions. Part of the advance, states the Ministry, is to contribute towards additional merchants' costs, and there has also been an adjustment for certain special grades of scrap iron and steel.

Chemical Matters in Parliament

Synthetic Vitamins

IN the House of Commons last week Sir E. Graham-Little asked the Parliamentary Secretary to the Ministry of Food what contracts had been placed for erecting the factory for the manufacture of synthetic B1, for equipping the same, and for staffing the establishment; whether other synthetic vitamins would be manufactured there, and if so, for what purpose; and, in particular, whether it was proposed to supply farmers and stock-breeders with synthetic vitamins in place of the natural food of cattle and other stock.

Major Lloyd George, in reply, stated that the only factory which was at present capable of producing the synthetic Vitamin B1 on a scale sufficiently large for its introduction into white flour had been erected as a result of private enterprise by a firm of chemical manufacturers. He was not in a position to give details of the contracts which had been placed by the owners of the factory, nor of the staffing of the factory, but it was understood that the same manufacturers were engaged in the manufacture of the antiscorbutic vitamin. He was not aware of any proposals to supply farmers and stock-breeders with synthetic vitamins for use as feed for their livestock.

Phosphates from Sewage

Mr. Wootton-Davies asked the Minister of Agriculture whether, in view of the shortage of phosphates in easily soluble form he would inquire whether it was possible to alter the precipitants generally used in sewage works so as to recover the phosphates in a usable form; and whether he would examine the possible extension of manure supplies from sewage works.

Mr. Hudson stated that he was advised that precipitants were not at all extensively used in sewage works and that no satisfactory process was known for the recovery of phosphates from sewage. No precise information was available as to the amounts of phosphates contained in the material. He was collaborating, however, with the Agricultural Research Council, in pressing forward an investigation into the treatment of sewage sludge and other kinds of town refuse with a view to their use as fertilising materials in the most suitable form.

A Chemist's Bookshelf

THE ADVANCE OF THE FUNGI. By E. C. Large. London: Jonathan Cape. Pp. 48. 18s.

Mr. Large has used, in writing this volume, all the verve and vigour that he put into his well-known semi-scientific novels; and he has used it to even better purpose. Much as we enjoyed reading his fictional works, we have derived even greater pleasure from this, his first purely scientific book. There is only one difficulty about it, from the reviewer's standpoint, and that is that it is almost impossible to "skip." It is indeed refreshing, for one accustomed to scientific and technical books, to come across an authoritative volume that is eminently readable, and not merely an accurate record of the subject in hand. Not that Mr. Large fails in accuracy; on the contrary, his book is full of meticulous detail, and he is the first to appreciate accuracy in the work of others. But he succeeds, where others often fail, in making his subject live; he has a sense of humour and a social consciousness (not a very usual combination); he has whips for the complacent "scientist" who argues on inadequate premises, and scorpions for the stupid or dishonest industrialist who holds back the advance of science whether from sheer conservatism or for reasons of personal profit. In fact, the whole thing is most stimulating, and presents not simply a mycological record, but actually a scientific picture of the economic history of the world in the past 150 years. As far as the chemical industry is directly concerned, the most important chapter is, naturally, that dealing with fungicides, fumigants, and emulsions, and the more recent "organic mercurials," but it is always pleasant to be reminded appreciatively of the classic experiments of Pasteur on the isolation of optically active compounds through the agency of moulds.

INSECT PESTS IN STORED PRODUCTS. By H. Hayhurst, F.I.C., A.M.I.Chem.E. London: Chapman and Hall. Pp. 83. 15s.

This is a concise, clear, and convenient book of reference, invaluable to all those who are concerned with stored products that are subject to insect infestation. The pests concerned are described under their natural orders, the Coleoptera, as might be expected, occupying nearly half the book. In addition to the insects, certain members of the Arachnida are included, namely, the Tyroglyphidæ, or flour-mites, and *Cheyletus* which preys upon them; there is also a note on the beneficent Cheliferidæ, or false scorpions, which are likewise predaceous on certain noxious insect pests The illustrations, from photographs by Harry Britten, F.R.E.S., are admirable, and form an indispensable adjunct to the text (there is even one species illustrated which seems to have been squeezed out of the text, to wit *Chernes panzeri*); and the alphabetic list of substances likely to be infested, with their relevant pests, forms a useful short cut to the commercial application of the volume.

OFFICIAL AND TENTATIVE METHODS OF ANALYSIS. Published by Association of Official Agricultural Chemists, Washington, D.C. Pp. 757. 5s.

The Association of Official Agricultural Chemists was organised in 1884 in response to an acutely felt need for the standardisation of methods of analysis used in regulation and research, and the volume reviewed affords noteworthy evidence of the growth of the organisation and its work, a valuable contribution to agriculture. Forty-three chapters with 61 illustrations cover practically every subject of importance to agricultural chemists, and 25 reference tables complete the thoroughly selective text of the book, which as a whole deserves high commendation to chemists engaged in agriculture. An appendix includes definitions of terms and interpretations of results with fertilisers and liming materials.

CHEMICAL COMPUTATIONS AND ERRORS. By Thomas B. Crumpler, Ph.D. and John H. Yoe, Ph.D. New York: John Wiley and Sons. London: Chapman and Hall. Pp. 247. 18s.

This book deals with mathematics in so far as a chemist requires a working knowledge of it, not only in order to be able to employ mathematical formulæ and to conduct numerical calculations, but also to be capable of interpreting numerical results. It therefore serves not merely as a text-book on chemical computations and errors, but also as a supplementary textbook for quantitative analysis and physical chemistry. Many illustrative examples and exercises are worked out in detail and the descriptive sections are dealt with in eleven chapters, each with a set of problems to be solved (with their answers given in an appendix). A select and classified bibliography and many tables will help those who wish to extend their studies further.

Examination of Coal Seams

Report from South Derbyshire

WITH the publication of Fuel Research Survey Paper No. 52 (H.M.S.O., 2s.), in the series of such papers dealing with the physical and chemical survey of the coal seams of Great Britain, details are now available of the Kilburn seam of South Derbyshire. The seam was sampled, in the usual manner, by means of seven complete sections taken from well distributed sites. Each sample was subdivided in the laboratory and examined in detail, the determinations made being as follows: proximate and ultimate analysis, forms of sulphur, carbon dioxide, chlorine, phosphorus, calorific value, fusion point of ash, laboratory carbonisation assay and agglutinating value.

The seam, one of the lowest worked in the area, maintains a fairly uniform thickness of 4 ft. It consists of Top Brights and Bottom Brights, separated by the Hards, the Brights forming a household fuel, while the Hards are used for steam raising and general industrial purposes. It was found that the coal was of a very uniform nature over the limited area examined. As is normal in this area the caking properties were weak, the highest agglutination value recorded being 16/20, but in the low-temperature carbonisation assay the yields of tar and gas were high. The moisture content varied between 7 and 12 per cent. and the ash content between about 3 and 6 per cent. The volatile matter of the Brights was between 40 and 44 per cent., while that of the Hards was lower, being between 37 and 41 per cent. The total sulphur content of the whole seam was low. The calorific value, on an air-dried basis, was found to be between 11,230 and 12,850 B.Th.U. per pound.

Australian Chemical News

Consolidation of I.C.I. Interests

AS part of the consolidation of the interests controlled by Imperial Chemical Industries of Australia and N.Z., Ltd., two new associated companies—Newcastle Chemical Co. Pty., Ltd., and Albright and Wilson (Aust.) Pty., Ltd.—have been formed. The former of the new companies has been formed in association with Broken Hill Pty. Co., Ltd., to manufacture chiefly heavy chemicals for the steel industry, the most important at present being galvanisers' crystals. The Albright and Wilson company has been formed in association with Albright and Wilson, Ltd., England, to manufacture phosphorus compounds, including food phosphates. The two companies are to supply chemicals previously imported from Great Britain. In addition, I.C.I. Alkali (Aust.) Pty., Ltd., announce that Australian-produced caustic soda and bicarbonate of soda will be available by the end of 1940.

General News——From Week to Week

MESSRS. HUGH HIGHGATE AND CO., oil refiners, Paisley, have contributed £10,000 to the Paisley War Weapons Week.

THE NEW ADDRESS of Harold Wilson and Witco, Ltd., is 101 Baker Street, London, W.1. (Tel.: WELbeck 3776-7).

IT IS ANNOUNCED by the Starch Section of the Ministry of Food that starch control will not come into operation before January 6 next.

AT BLACKBURN POLICE COURT John William Lees, chemical manufacturer, of Blackburn, was fined £3 for a breach of the emergency lighting regulations at his works.

MESSRS. JOHN POYNTER, SON AND MACDONALDS, LTD., chemical manufacturers, Glasgow, have contributed £25 to the City of Glasgow Central War Relief Fund.

A THIRD ADDENDUM to the British Pharmacopœia, to deal with emergency conditions, is shortly to be published by the General Medical Council, and will become official on January 1, 1941.

IN VIEW OF THE PRESENT EMERGENCY, Liverpool University Authorities have decided not to proceed with the planned addition to the inorganic chemistry building in Brownlow Street, Liverpool.

A CARGO OF BAUXITE, coal and resin, valued at £44,723, from the German ship *Morea*, was condemned on Tuesday by the President of the Prize Court, London, and is now available to British industry.

ATTENTION IS DRAWN to the new addresses of the following Government departments: Industrial Supplies (Registers), Department, Board of Trade, Carlton Hotel, East Cliff, Bournemouth. (Tel.: Bournemouth 7210); and Department of Overseas Trade, Glenroy Hall, St. Michael's Road, West Cliff, Bournemouth. (Tel.: Bournemouth 7280).

THE MANUFACTURE OF CEMENT from blast-furnace slag was one of the expedients mentioned in a recent statement by Mr. Hugh Beaver, Priority Officer and Controller of Building Materials in the Ministry of Works and Buildings. To counteract the difficulty of constructing new cement factories, many other ways of increasing cement production were being found.

MESSRS. MAY AND BAKER, LTD., Dagenham, announce increased prices for bromides, to date from November 25, as follows: Potassium bromide, B.P., 2s. 8½d. to 3s. 4d. per lb., according to quantity (increase 6½d. per lb.); sodium bromide, B.P., 2s. 9½d. to 3s. 5d. per lb., according to quantity (increase 5d. per lb.); ammonium bromide, B.P., 2s. 11½d. to 3s. 7d. per lb., according to quantity (increase 6d. per lb.). Special prices for quantities over 5 cwt.

APPLICATIONS ARE INVITED for a Harlow Fellowship under the Harlow Memorial Trust. The fellowship will be of the value of £250 per annum, will be tenable for two years, and may conditionally be extended. The Fellow will be required to undertake research at the Technical College, Bradford, in one of the branches of pure or applied science. Applications, giving full particulars of previous career, should be submitted to the Principal, Technical College, Bradford, not later than January 1, 1941. No special forms of application are required.

AT THE CENTRAL CRIMINAL COURT on Monday, pleas of "Not Guilty" were entered by Doreen Grant Gibbons, Louis Francis Szilagyi and Thomas Ogle, described as company directors, in respect of an indictment charging them with trading with the enemy; a similar plea was also made to charges brought against Metal and Electro-Chemical Products, Ltd., of London. Mr. G. D. Roberts, K.C., defending Miss Gibbons, asked for an adjournment, and Mr. Justice Asquith postponed the hearing until the next Session, the defendants being allowed bail.

A FURTHER ANNOUNCEMENT regarding the Purchase Tax applicable to articles in Class 19 (Drugs and Chemicals) states that the following materials in powder form are not liable to the tax unless put up as drugs or medicines: (1) drugs occurring naturally in powder form; (2) spices, condiments and colouring substances; (3) gums, gum resins, oleo-gum-resins, balsamic resins, oleo-resins and resins; and (4) bassia (Mowrah), chondrus (Irish moss), cuttle-fish bone, derris, orris, pyrethrum flowers, sabadilla, staphisagria and tobacco. All other natural drugs are liable in powder form.

Foreign News

THE MALAYAN INFORMATION AGENCY states that the rate of release of rubber from Malaya for the first quarter of 1941 has been fixed at 97½ per cent.

SOAP IS NOW RATIONED in Sweden, and, since the end of November, petrol is no longer available for any civil purposes except medical, police, and fire services, and for certain special industrial needs. Wood-charcoal generators are being installed on public vehicles.

PLANS FOR THE new industrial research laboratory of the Australian Council for Scientific and Industrial Research have now reached the final stages. The laboratory is to be built at Fishermen's Bend, Melbourne, at a cost of £50,000, and to begin with will be devoted to six main lines of study: non-metallic minerals, metals and alloys, wool and other fibres, hides and leather, and dairy products.

Chemical and Allied Stocks and Shares

ALTHOUGH business on the Stock Exchange has again been of small proportions, the general market trend tended to improve subsequently, sentiment having been assisted by the latest war news. Chief attention centred on Government securities, but leading industrial securities showed a partial rally.

Following a decline to 28s., Imperial Chemical rallied to 28s. 4½d., which compares with 28s. 3d. a week ago; the preference units at 31s. 6d. were unchanged on balance. B. Laporte were firmly held and were quoted at 50s., while in other directions business in Lawes Chemical has taken place at 7s. 3d. Moreover, Greeff-Chemicals Holdings 5s. units transferred up to the higher price of 6s. 3d. Borax Consolidated were inactive, and the deferred units remained at 26s. 3d. On the other hand, Turner and Newall lost part of their recent rise and were 65s. compared with 67s. 6d. a week ago, while British Aluminium reacted from 41s. 3d. to 40s. 9d., and British Oxygen were easier at 63s. 9d., which compares with 64s. 4½d. a week ago. In other directions, Barry and Staines were lower at 25s., and Michael Nairn changed hands up to 46s. and were quoted at 45s. "middle"; the financial results fall to be issued early next month.

Lever and Unilever became slightly easier at 23s. 6d., but quotations for the company's various classes of preference shares were maintained, and British Oil and Cake preferred were slightly better. Dunlop Rubber tended to recover after a small reaction and are 31s. 6d. at the time of writing, while the units of the Distillers Co. were relatively steady around 64s. 6d., and United Molasses had a firmer appearance at 22s. 3d. Elsewhere, International Paint changed hands at a better price, and Lewis Berger were higher at 38s. although "ex" the recently-declared dividend. Moreover, Pinchin Johnson became firmer at 18s. Among iron, steel and kindred securities, however, there was again an easier tendency, sentiment having continued to be influenced by the factor of increasing production costs in the heavy industries. Dorman Long were 18s. 3d. and United Steel 21s. Stewarts and Lloyds were relatively steady at 40s. 7½d., but in other directions Babcock and Wilcox were easier at 39s., as were Ruston and Hornsby at 23s. 6d. Exceptionally, there was a somewhat firmer tendency reported in Richard Thomas shares. Imperial Smelting and General Refractories were steady at 10s. 3d. and 7s. respectively, but were inactive. Triplex Glass were quoted at 17s. 6d. Wall Paper Manufacturers deferred units lost most of an earlier rally, but at 20s. 3d. were quite well maintained on balance.

Cement shares were little changed, and British Plaster Board were 12s. Rayon shares were inclined to improve on the good expansion in earnings shown by the British Celanese results. The market is very hopeful that a moderate increase in Courtaulds' dividend may be in prospect. Elsewhere, British Match were 31s., but in common with many shares of stores concerns, which have been affected by the question of rationing of supplies, Boots Drug ordinary units have moved down to 36s. 6d. at the time of writing. Timothy Whites, however, were relatively steady at 20s., but Sangers eased to 19s. 3d. on the interim dividend. Few dealings were recorded in Low Temperature Carbonisation, British Industrial Plastics and other smaller-priced securities. Leading oil shares were inclined to improve.

Weekly Prices of British Chemical Products

BUYING in nearly all sections of the general chemical market during the past week has been for spot or to meet near delivery requirements and the tendency at the present time is for short-term transactions to replace former contract business. There has been little change in current prices and quotations are on a steady to firm basis. Formaldehyde, acetone, acetic, oxalic and citric acids are in steady call and a moderately active demand is reported for most of the potash and soda products. Prices generally appear to be well held and with few exceptions the undertone is firm.

MANCHESTER.—Steady to firm price conditions have again been reported on the Manchester chemical market during the past week and in view of the likelihood of early advances in a number of directions there is no pressure to sell any distance ahead. Delivery specifications for most of the leading bread-and-butter lines, including the alkalies and heavy acids, are on a fair scale, with the bleaching, dyeing and finishing trades prominent in this respect. With regard to the by-products activity continues in most of the light materials at a firm range of prices, though a certain amount of easiness is still in evidence in pyridine and crude carbolic.

GLASGOW.—Business in home and export Scottish heavy chemical trade remains about normal. Prices keep firm with a slight advance to overcome the increased railway rates. It is anticipated that at the beginning of the New Year a general rise will take place. Very few contracts have yet been placed for 1941. Difficulty, in anticipating oncosts and delivery of materials, etc., at the present time, prevents the manufacturers from quoting for forward delivery in large quantities.

Price Changes

Rises: Borax, Commercial; Boric Acid; Trisodium Phosphate.

General Chemicals

Acetic Acid.—Maximum prices per ton: 80% technical, 1 ton £36 10s.; 10 cwt./1 ton, £37 10s.; 4/10 cwt., £38 10s.; 80% pure, 1 ton, £38 10s.; 10 cwt./1 ton, £39 10s.; 4/10 cwt., £40 10s.; commercial glacial, 1 ton, £46; 10 cwt./1 ton, £47; 4/10 cwt., £48; delivered buyers' premises in returnable barrels. £4 per ton extra if packed and delivered in glass.

Acetone.—Maximum prices per ton, 50 tons and over, £52 10s.; 10/50 tons, £53; 5/10 tons, £53 10s.; 1/5 tons, £54; single drums, £55, delivered buyers' premises in returnable drums or other containers having a capacity of not less than 45 gallons each; delivered in containers of less than 45 gallons but not less than 10 gallons £10 10s. per ton in excess of maximum prices; delivered in containers less than 10 gallons each £10 10s. per ton in excess of maximum prices, plus a reasonable allowance.

Alum.—Loose lump, £9 10s. per ton, d/d, nominal.

Aluminium Sulphate.—£8 to £8 10s. per ton d/d.

Ammonia Anhydrous.—99.95%, 6s. 7d. to 2s. per lb., according to quantity and type of cylinders which are returnable; carriage paid; less for important contracts.

Ammonium Carbonate.—£32 to £36 per ton d/d in 5 cwt. casks.

Ammonium Chloride.—Grey galvanising, £18 per ton, in casks, ex wharf. MANCHESTER: Grey galvanising, £19 to £20 per ton. See also Salammoniac.

Antimony Oxide.—£68 per ton.

Arsenic.—99/100%, about £30 per ton, ex store.

Barium Chloride—98/100%, prime white crystals, £11 10s. 0d. to £13 per ton, bag packing, ex works; imported material would be dearer.

Bleaching Powder.—Spot, 35/37%, £9 10s. to £10 per ton in casks, special terms for contract.

Borax, Commercial.—Granulated, £26; crystals, £27; powdered, £27 10s.; extra fine powder, £28 10s.; B.P. crystals, £35; powdered, £35 10s.; extra fine, £36 10s. per ton for ton lots, in free 1-cwt. bags, carriage paid in Great Britain. Borax Glass, lump, £73; powder, £74 per ton in tin-lined cases for home trade only, packages free, carriage paid.

Boric Acid.—Commercial, granulated, £42 10s.; crystals, £43 10s.; powdered, £44 10s.; extra fine powder, £46 10s.; large flakes, £55; B.P. crystals, £51 10s.; powdered, £52 10s.; extra fine powdered, £54 10s. per ton for ton lots in free 1-cwt. bags, carriage paid in Great Britain.

Calcium Bisulphite.—£6 10s. to £7 10s. per ton f.o.r. London.

Calcium Chloride.—70/75% solid, £5 10s. per ton ex store.

Charcoal Lump.—£10 10s. to £14 per ton, ex wharf. Granulated, supplies scarce.

Chlorine, Liquid.—£19 15s. per ton, d/d in 16/17 cwt. drums (3-drum lots); 4¾d. per lb. d/d station in single 70-lb. cylinders.

Chrometan.—Crystals, 4½d. per lb.; liquor, £19 10s. per ton d/d station in drums. GLASGOW: Crystals 4d. per lb. in original barrels.

Chromic Acid.—1s. 2d. per lb., less 2½%; d/d U.K. GLASGOW: 1s. 0¼d. per lb. for 1 cwt. lots.

Citric Acid.—1s. 2d. per lb. MANCHESTER: 1s. 6d.

Copper Sulphate.—About £29 10s. per ton f.o.b. MANCHESTER: £28 10s., less 2 %, in 5 cwt. casks f.o.b. Liverpool.

Cream of Tartar.—100%, £10 2s. per cwt., less 2½%, d/d in sellers' returnable casks.

Formaldehyde.—£21 15s. to £25 per ton d/d. MANCHESTER: 40%, £24 to £25 per ton in casks d/d; imported material dearer.

Formic Acid.—85%, £44 10s. per ton for ton lots, carriage paid, carboys returnable; smaller parcels quoted at 46s. 6d. to 49s. 6d. per cwt., ex store

Glycerine.—Chemically pure, double distilled, 1,260 s.g., in tins, £3 10s. to £4 10s. per cwt. according to quantity; in drums, £3 2s. 6d. to £3 16s. 0d. Refined pale straw industrial, 5s. per cwt. less than chemically pure.

Hexamine.—Technical grade for commercial purposes, about 1s. 4d. per lb.; free-running crystals are quoted at 2s. 1d. to 2s. 3d. per lb.; carriage paid for bulk lots.

Hydrochloric Acid.—Spot, 6s. 1½d. to 8s. 7½d. carboy d/d according to purity, strength and locality.

Iodine.—Resublimed B.P., 9s. 2d. to 13s. per lb., according to quantity.

Lactic Acid.—Dark tech., 50% by vol., £31 per ton; 50% by weight, £38; 80% by weight, £67; pale tech., 50% by vol., £39 10s.; 50% by weight, £46, 80% by weight, £74. Not less than one ton lots ex works; barrels returnable, carriage paid.

Lead Acetate.—White, £46 10s. to £48 10s. ton lots. MANCHESTER: £48 to £50 per ton.

Lead Nitrate.—About £45 per ton d/d in casks.

Lead, Red.—English, 5/10 cwt. £42; 10 cwt. to 1 ton, £41 15s.; 1/2 tons, £41 10s.; 2/5 tons, £41; 5/20 tons, £40 10s.; 20/100 tons, £40; over 100 tons, £39 10s. per ton, less 2½ per cent. carriage paid; non-setting red lead 10s. per ton dearer in each case. Continental material £1 per ton cheaper.

Lead, White.—Dry English, less than 5 tons, £52 10s.; 5/15 tons, £48 10s.; 15/25 tons, £48; 25/50 tons, £47 10s.; 50/200 tons, £47 per ton less 5 per cent. carriage paid; Continental material £1 per ton cheaper. Ground in oil, English, 1/5 cwt., £61; 5/10 cwt., £60; 10 cwt. to 1 ton, £59 10s.; 1/2 tons, £58; 2/5 tons, £57; 5/10 tons, £55; 10/15 tons, £54; 15/25 tons, £53 10s.; 25/50 tons, £53; 50/100 tons, £52 10s. per ton less 5 per cent. carriage paid. Continental material £2 per ton cheaper.

Litharge.—1 to 2 tons, £41 10s. per ton.

Lithium Carbonate.—7s. 9d. per lb. net.

Magnesite.—Calcined, in bags, ex works, £14 to £17 per ton

Magnesium Chloride.—Solid (ex wharf), £12 to £13 per ton. MANCHESTER: £13 to £14 per ton.

Magnesium Sulphate.—Commercial, £10 to £12 per ton, according to quality, ex works.

Mercury Products.—Controlled price for 1 cwt. quantities: Bichloride powder, 12s. 3d.; bichloride lump, 12s. 10d.; ammon. chloride powder, 14s. 2d.; ammon. chloride lump, 14s.; mercurous chloride, 14s. 7d.; mercury oxide, red cryst., B.P., 16s. 4d.; red levig. B.P., 15s. 10d.; yellow levig. B.P. 15s. 9d.

Methylated Spirit.—Industrial 66 O.P. 100 gals., 2s. 0½d. per gal.; pyridinised 64 O.P. 100 gals., 2s. 1½d. per gal.

Nitric Acid.—£21 10s. to £29 10s. per ton ex works.

Oxalic Acid.—From £59 5s. per ton for ton lots, carriage paid, in 5-cwt. casks; smaller parcels would be dearer; deliveries slow.

Paraffin Wax.—Nominal.

Potash, Caustic.—Solid, 88/92%, commercial grade, £53 7s. 6d. per ton, c.i.f. U.K. port, duty paid.

Potassium Bichromate.—Crystals and granular 6¾d. per lb.; ground 7d. per lb., carriage paid. MANCHESTER and GLASGOW: 6¾d. per lb. in orig. casks.

Potassium Carbonate.—Hydrated, 83/85%, £46 17s. 6d. per ton; calcined, 98/100%, £52 2s. 6d. per ton, c.i.f. U.K. port.

Potassium Chlorate.—Imported powder and crystals, ex store London, 10d. to 1s. per lb.

Potassium Iodide.—B.P., 8s. to 11s. 2d. per lb., according to quantity.

Potassium Nitrate.—Small granular crystals, £26 to £30 per ton ex store, according to quantity.

Potassium Permanganate.—B.P., 1s. 4½d. to 1s. 5½d. per lb.; commercial, £7 9s. 6d. to £8 1s. 6d. per cwt., according to quantity d/d.

Potassium Prussiate.—Yellow, about 1s. 2d. to 1s. 5d. per lb., supplies scarce.

Salammoniac.—Dog-tooth crystals. £50 per ton; medium, £48 10s. per ton; fine white crystals, £16 10s. per ton, in casks, ex store.

Soda, Caustic.—Solid, 76/77% spot, £14 10s. per ton d/d station.

Soda Crystals.—Spot, £5 to £5 5s. per ton d/d station or ex depot in 2-cwt. bags.

Sodium Acetate.—£37 to £40 per ton, ex wharf.

Sodium Bicarbonate.—About £10 10s. to £11 10s. per ton, in bags.

Sodium Bichromate.—Crystals, cake and powder, 5d. per lb., anhydrous, 6d. per lb. net d/d U.K. MANCHESTER and GLASGOW: 5d. per lb., in orig. casks.

Sodium Bisulphite Powder.—60/62%, £16 per ton d/d in 2-ton lots for home trade.

Sodium Carbonate Monohydrate.—£20 per ton d/d in minimum ton lots in 2 cwt. free bags.

Sodium Chlorate.—£36 to £45 per ton, d/d, according to quantity.

Sodium Hyposulphite.—Pea crystals, £17 15s. per ton for 2-ton lots; commercial, £13 10s. per ton. MANCHESTER: Commercial, £13 10s.; photographic, £17 10s.

Sodium Iodide.—B.P., for not less than 28 lb., 8s. 10d. per lb.; for not less than 7 lb., 10s. 9d. per lb.

Sodium Metasilicate.—£14 5s. per ton, d/d U.K. in cwt. bags.

Sodium Nitrate.—Refined, £10 to £11 per ton for 6-ton lots d/d

Sodium Nitrite.—£22 to £23 per ton for ton lots.

Sodium Perborate.—10%, £4 12s. 6d. per cwt. d/d in 1-cwt. drums.

Sodium Phosphate.—Di-sodium, £17 per ton, delivered, for ton lots. Tri-sodium, £22 per ton d/d for ton lots.

Sodium Prussiate.—From 6¾d. per lb. ex store.

Sodium Silicate.—£9 15s. per ton, for 4-ton lots.

Sodium Sulphate (Glauber Salts).—£4 10s. per ton d/d.

Sodium Sulphate (Salt Cake).—Unground. Spot £4 3s. 6d. per ton d/d station in bulk. MANCHESTER: about £4 ex works.

Sodium Sulphide.—Solid 60/62%, Spot, £14 10s. per ton d/d in drums; crystals, 30/32%, £10 5s. per ton d/d in casks. MANCHESTER: 30/32%, £10 10s. per ton in 2-ton lots.

Sodium Sulphite.—Pea crystals, spot, £16 10s. per ton d/d station in kegs; commercial, £11 15s. per ton d/d station in bags.

Sulphur.—Finely powdered, 17s. 6d. per cwt. d/d; precip. B.P., 68s. per cwt.

Sulphuric Acid.—168° Tw., £6 2s. 3d. to £6 13s. 3d. per ton; 140° Tw., arsenic-free, £4 7s. 6d. to £4 17s. 6d. per ton; 140° Tw. arsenious, £4 per ton; quotations naked at sellers' works.

Tartaric Acid.—2s. 6½d. per lb., less 5%, carriage paid for lots of 5 cwt. and upwards. MANCHESTER: 2s. 6½d. per lb.

Zinc Oxide.—Maximum prices: White seal, £30 17s. 6d. per ton; red seal, £28 7s. 6d. d/d; green seal, £29 17s. 6d. d/d buyers' premises.

Zinc Sulphate.—Tech., about £25, carriage paid, casks free.

Rubber Chemicals

Antimony Sulphide.—Golden, 9½d. per lb. Crimson, 1s. 11d. per lb.

Arsenic Sulphide.—Yellow, 1s. 9d. per lb.

Barytes.—Best white bleached, £7 3s. 6d. per ton.

Cadmium Sulphide.—6s. per lb.

Carbon Black.—5½d. per lb.

Carbon Bisulphide.—£32 5s. to £37 5s. per ton, according to quantity, in free returnable drums.

Carbon Tetrachloride.—£46 to £49 per ton.

Chromium Oxide.—Green, 1s. 6d. per lb.

India-rubber Substitutes.—White, 6¾d. per lb.; dark, 6d. per lb.

Lithopone.—30%, £25 per ton; 60%, £31 to £32 per ton. Imported material would be dearer.

Mineral Black.—£10 to £14 per ton.

Mineral Rubber, "Rupron."—£20 per ton.

Sulphur Chloride.—7d. per lb.

Vegetable Lamp Black.—40s. per cwt., d/d.

Vermilion.—Pale or deep, 14s. 6d. per lb., for 7 lb. lots and less. Plus 5% War Charge.

Nitrogen Fertilisers

Ammonium Phosphate Fertilisers.—Type A, £21 8s.; B, £15 5s. 6d.; C, £18 17s. per ton in 6-ton lots, d/d farmer's nearest station up to June 30, 1941. Rebate of 1s. 6d. per ton per month for deliveries made prior to March 1, 1941.

Ammonium Sulphate.—Per ton in 6-ton lots, d/d farmer's nearest station: December, £9 17s. 6d.; January, £9 19s.; February, £10 0s. 6d.: March/June, £10 2s.

Calcium Cyanamide.—Nominal: supplies very scanty.

Concentrated Complete Fertilisers.—£15 10s. to £16 3s. 6d. per ton in 6-ton lots, d/d farmer's nearest station up to June 30, 1941. Supplies small except C.C.F. Special at £15 14s. per ton.

"Nitro-Chalk."—£9 14s. per ton in 6-ton lots, d/d farmer's nearest station up to June 30, 1941.

Sodium Nitrate.—Chilean, £13 10s. per ton in 2-ton lots, f.o.r. Liverpool, December delivery: agricultural, £10 14s. per ton in 2-cwt. bags, d/d farmer's nearest station up to June 30, 1941.

Coal Tar Products

Benzol.—Industrial (containing less than 2% of toluol), 2s. to 2s. 2d. per gal., ex works.

Carbolic Acid.—Crystals, 9½d. to 10¾d. per lb.; Crude, 60's 3s. 6d. to 4s. 2d., according to specification. MANCHESTER: Crystals, 10½d. per lb., d/d; crude, 3s. 6d. to 3s. 9d. naked at works.

Creosote.—Home trade, 5½d. to 6d. per gal., f.o.r., makers' works; exports 6d. to 6½d. per gal., according to grade. MANCHESTER: 5d. to 7d. per gal.

Cresylic Acid.—Pale, 99/100%, 2s. 3d. per gal MANCHESTER: Pale, 99/100%, 2s. 2d. per gal.

Naphtha.—Solvent, 90/160°, 1s. 11d. to 2s. 1d. per gal.; Heavy 90/190°, 1s. 7d. to 1s. 8d. naked at works. MANCHESTER: 90/160°, 2s. 1d. to 2s. 3d.

Naphthalene.—Crude, whizzed or hot pressed, £14 per ton: purified crystals, £27 per ton in 2-cwt. bags; flaked, £27 per ton. Fire-lighter quality, £6 to £7 per ton ex works. MANCHESTER: Refined, £26 per ton.

Pitch.—Medium, soft, 50s. per ton (nominal) f.o.b. MANCHESTER: Nominal.

Pyridine.—90/140°, 18s. 6d. per gal.: 90/160°, 16s.; 90/180°, 4s. to 5s. per gal., f.o.b. MANCHESTER: 14s. to 17s. per gal.

Toluol.—Pure, 2s. 5d., nominal. MANCHESTER: Pure, 2s. 5d. per gal., naked.

Xylol.—Commercial, 2s. 9d. per gal.; pure, 2s. 11d. MANCHESTER: 3s. to 3s. 4d. per gal.

Wood Distillation Products

Calcium Acetate.—Brown, £8 10s. to £10 per ton; grey, £13 to £14. MANCHESTER: Grey: £20.

Methyl Acetone.—40.50%, £42-£45 per ton.

Wood Creosote.—Unrefined, 2s. per gal., according to boiling range.

Wood Naphtha, Miscible.—4s. 6d. to 5s. per gal.; solvent, 5s. per gal.

Wood Tar.—£5 to £6 per ton, according to quality.

Intermediates and Dyes (Prices Nominal)

m-**Cresol** 98/100%.—1s. 8d. to 1s. 9d. per lb. in ton lots.

o-**Cresol** 30/31° C.—8d. to 9d. per lb. in ton lots.

p-**Cresol** 34/35° C.—1s. 8d. to 1s. 9d. per lb. in ton lots.

Dichloraniline.—2s. 8½d. per lb.

Dinitrobenzene.—8d. per lb.

Dinitrotoluene.—48/50° C., 9½d. per lb.; 66/68° C., 1s.

p-**Nitraniline.**—2s. 5d. per lb.

Nitrobenzene.—Spot, 5½d. per lb., in 90-gal. drums, drums extra, 1-ton lots d/d buyer's works.

Nitronaphthalene.—1s. 2d. per lb.; P.G., 1s. 0½d. per lb.

o-**Toluidine.**—1s. per lb., in 8/10 cwt. drums, drums extra.

p-**Toluidine.**—2s. 2d. per lb., in casks.

m-**Xylidine Acetate.**—4s. 5d. per lb., 100%.

Latest Oil Prices

LONDON.—December 11.—For the period ending December 28 per ton, net, naked, ex mill, works or refinery, and subject to additional charges according to package and location of supplies:—LINSEED OIL, raw, £41 10s. RAPESEED OIL, crude, £44. COTTONSEED OIL, crude, £31 2s. 6d.; washed, £34 5s.; refined edible, £35 12s. 6d.; refined deodorised, £36 10s. SOYA BEAN OIL, crude, £33; refined deodorised, £37. COCONUT OIL, crude, £28 2s. 6d.; refined deodorised, £31 7s. 6d. PALM KERNEL OIL, crude, £27 10s.; refined deodorised, £30 15s. PALM OIL, refined deodorised, £33. GROUNDNUT OIL, crude, £35 10s.; refined deodorised, £40. WHALE OIL, crude hardened, 42 deg., £30 10s.; refined hardened, 42 deg., £33. ACID OILS.—Groundnut, £19; soya, £17; coconut and palm kernel, £22 10s. ROSIN, 25s. to 30s. per cwt., ex wharf, according to grade.—TURPENTINE, Spot, American, nominal.

HULL.—December 10.—Spot, American, nominal.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for errors that may occur.

County Court Judgments

O'CONNOR, N. (male), Scotts Road, Southall, Middlesex. (C.C.J., 14/12/40.) New process welder. £14 13s. 0d. October 10.

SEVIOR, WM. LESLIE, 15 Redeross Way, London Bridge, S.E.1 (trading as Leslie & Roe). (C.C.J., 14/12/40.) Paint, colour and varnish manufacturer. £22 6s. 9d. October 1.

Company News

British Tar Products have declared a final dividend of 5½ per cent. on ordinary and preferred shares, making 10 per cent. (same).

Titanine, Ltd., manufacturers of aeroplane dopes, have declared an interim dividend of 10 per cent. (same).

Boots Pure Drug Co., Ltd., have declared a quarterly dividend of 6 per cent. (same).

Sangers, Ltd., have declared an interim dividend of 7½ per cent. (10 per cent.).

The Sulphide Corporation, Ltd., has declared an interim dividend of 5 per cent. on the preference shares in respect of the year ended June 30. Annual meeting, December 20.

Dacrematt, Ltd., manufacturers of and dealers in paints and varnishes, etc., 31 John Street, Bedford Row, W.C.1, have increased their nominal capital by the addition of £4,900, in £1 ordinary shares, beyond the registered capital of £100.

British Industrial Plastics, Ltd., record a gross profit, to September 30 last, of £163,069 (£110,631 in 1938-39). Heavier expense items and a substantial advance in tax charges (from £20,000 to £56,500) leave net profits showing relatively little alteration at £23,198. (£21,959). Ordinary dividend is 8 per cent. (same). Balance forward £3677 (£5681).

New Companies Registered

Chemi-Synthetics, Ltd. (364,205).—Private company. Capital: £1000 in 1000 shares of £1 each. Research, manufacturing and general chemists, druggists, manufacturers of and dealers in industrial, pharmaceutical, agricultural and synthetic products, etc. Subscribers: Jack Huggett and Peter Jones, 16 Bruton Place, W.1. Jack Huggett is the first director.

L. H. Manderstam and Partners, Ltd. (364,157).—Private company. Capital, £100 in 100 shares of £1 each. Consultants, advisers, designers to engineers, metallurgists, chemists, architects and others, analytical and research chemists, engineers, etc. Subscribers: L. H. Manderstam, 11 Adelaide Court, Abbey Road, N.W.8, A. L. Dugon.

SUBMERSIBLE ELECTRO PUMP

Simplicity in operation is one of the most attractive features of the "Sumo" submersible electro pump, manufacturer by SUMO PUMPS, LTD., Lighthouse Works, Smethwick, Birmingham. A well-produced and informative brochure illustrates the method of operating the pump, as well as its many advantages, which are of importance not only to chemical works, laundries, refineries, breweries, etc., but also for domestic and farm supply and for fire-fighting. The pump is used for deep-well pumping where A.C. is available, pump and motor being suspended in the well or borehole on the rising main, below the pumping-water level. It is interesting to note that the design of the pump originated from Vienna and that German firms were the principal suppliers before the war; but home-trade and export orders lately received at Smethwick encourage the hope that they will find it difficult to re-enter the market. Those interested should write to the manufacturers for brochure CE1 and price-list AfEP.

A MESSAGE FROM TOKIO states that the chairman, all seventeen directors and five auditors of the Japan Ironworks, the largest iron manufacturing company in the country, have resigned. The chairman issued a statement that Japan's iron industry must be reorganised so as to be independent of Britain and the United States.

APPOINTMENTS VACANT

RESEARCH CHEMIST required for development work. Applicants must have B.Sc. or A.I.C. and several years experience of inorganic or physics-chemical work. State age, experience and qualifications, also salary, etc., to Box No. 2002, THE CHEMICAL AGE, 154 Fleet Street, E.C.4.

EDUCATIONAL

FOR SALE

LIMITATION of supplies (Miscellaneous) order very large quantity of surplus quota Class 16 for sale. Replies to Box 1999, THE CHEMICAL AGE, 154 Fleet Street, E.C.4.

CHARCOAL, ANIMAL, and VEGETABLE, horticultural, burning, filtering, disinfecting, medicinal, insulating; also lumps ground and granulated; established 1830; contractors to H.M. Government.—THOS. HILL-JONES, LTD., "Invicta" Mills, Bow Common Lane, London, E. Telegrams, "Hill-Jones, Bochurch, London." Telephone : 3285 East.

100 REBUILT Hydro Extractors by all leading makers from 18 in. upwards with countershafts attached and safety covers. Jacketed Steam Pans, various sizes. List on request. Seen at Randalls, Arundel Terrace, Barnes. Telephone : Riverside 2436.

50,000 FEET brand new Balata and Rubber Belting, all popular sizes. Every belt guaranteed and sent on approval at bargain prices. Write for stock and price lists, F. Taylor & Sons (Manchester), Ltd., Barr Hill Works, Salford, 6, Lancs.

COMBINED AUTOMATIC WEIGHING, MEASURING and Mixing Plant, with six weighers, capacity about one ton per hour, with 20 h.p. and 7½ h.p. motors, elevator, conveyor, vibro-screen, etc. Can be seen erected in Kent. THOMPSON AND SON (MILLWALL), LTD., Cuba Street, Millwall, London, E.14. East 1844.

'Phone 98 Staines.

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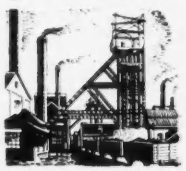

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